

IN THE CLAIMS:

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strike through~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

Please CANCEL claims 4, 12, 20, 25, 30-31 without prejudice or disclaimer, and AMEND claims 1, 7-9, 16, 19, 21-24, 26-27, 32, 38 and 40-41 in accordance with the following:

1. (CURRENTLY AMENDED) A method of recording data on an optical disc, the method comprising:

dividing each of a plurality of error correction code (ECC) blocks corresponding to the data into a plurality of partitions which are formed by dividing each ECC block in row and column directions; and

interleaving the data from the plurality of the partitions so that partitions from each of the ECC blocks is-are alternately and equally-selected such that progression through the partitions of each ECC block occurs diagonally to generate a first recording block;

modulating the first recording block; and

recording the modulated first recording block on the optical disc.

2. (ORIGINAL) The method as claimed in claim 1, further comprising rearranging the first recording block to generate a second recording block.

3. (ORIGINAL) The method as claimed in claim 2, wherein the first recording block is rearranged on a sector basis to generate the second recording block.

4. (CANCELED)

5. (ORIGINAL) The method as claimed in claim 1, wherein the dividing of the ECC blocks comprises:

dividing each of the ECC blocks in a column direction by a predetermined number of bytes into object blocks; and

dividing each of the object blocks in at least one of a row direction and the column direction by the predetermined number of bytes to generate the plurality of partitions.

6. (ORIGINAL) The method as claimed in claim 5, wherein the interleaving comprises interleaving all of the data using a same algorithm.

7. (CURRENTLY AMENDED) The method as claimed in claim 1, wherein the interleaving the data comprises interleaving a predetermined number of bytes of the data from each ECC block ~~are extracted and rearranged to generate the first recording block.~~

8. (CURRENTLY AMENDED) The method as claimed in claim 1, wherein the dividing of the ECC blocks includes:

obtaining a common divisor d for $N1$ and $N2$ wherein a size of the ECC blocks is $N1 \times N2$ bytes where $N1$ and $N2$ are positive integers;

dividing each of the ECC blocks into units of d bytes in a column direction to generate $N2/d$ object blocks; and

dividing each of the object blocks into d portions in the column direction and a row direction to generate $d \times d$ of the partitions.

9. (CURRENTLY AMENDED) A method of recording data on an optical disc, the method comprising:

dividing each of two error correction code (ECC) blocks in row and column directions to

generate a plurality of partitions; and

generating a first recording block, the generating comprising interleaving the data from the partitions of each ECC block so that each of the ECC blocks is alternately and equally selected;

modulating the first recording block; and

recording the modulated recording block on the optical disc.

10. (ORIGINAL) The method as claimed in claim 9, further comprising rearranging the first recording block to generate a second recording block.

11. (ORIGINAL) The method as claimed in claim 10, wherein the first recording block is rearranged on a sector basis to generate the second recording block.

12. (CANCELED)

13. (ORIGINAL) The method as claimed in claim 9, wherein the dividing of the ECC blocks includes:

dividing each of the ECC blocks in the column direction by a predetermined number of bytes to generate object blocks; and

dividing each of the object blocks in the row and column directions by the predetermined number of bytes to generate the plurality of partitions, wherein the interleaving of the data comprises interleaving all of the data using a same algorithm.

14. (ORIGINAL) The method as claimed in claim 9, wherein the interleaving of the data comprises interleaving all of the data using a same algorithm.

15. (ORIGINAL) The method as claimed in claim 10, wherein the partitions each comprise a predetermined number of bytes of the data.

16. (CURRENTLY AMENDED) The method as claimed in claim 10, wherein the dividing of the ECC blocks includes:

obtaining a common divisor d for $N1$ and $N2$, wherein a size of the ECC blocks is $N1 \times N2$ bytes where $N1$ and $N2$ are positive integers;

dividing each of the ECC blocks by a unit of d bytes in the column direction to generate $N2/d$ object blocks; and

dividing each of the object blocks into d portions in the column and row directions to generate $d \times d$ of the partitions.

17. (ORIGINAL) The method as claimed in claim 16, wherein the generating of the first recording block comprises interleaving the data of the partitions such that $2 \times N2$ row-code words are included in the first recording block.

18. (ORIGINAL) The method as claimed in claim 16, wherein the ECC blocks have row-code words ($N1, k1$), and column-code words ($N2, k2$), and the first recording block includes a main data region of $2 \times (N2 - k2)$ bytes and an outer parity region of $2 \times k2$ bytes.

19. (CURRENTLY AMENDED) An apparatus to record data on an optical disc, the apparatus comprising:

an error correction code (ECC) encoder to generate a plurality of ECC blocks on which the data is recorded; and

an interleaver, comprising:

a partitioning portion to divide each of the ECC blocks into a first unit in a row

direction and a second unit in a column direction to generate a plurality of partitions,
a data extracting portion to alternately extract data from the partitions, and
a recording block generating portion to interleave the extracted data and generate
a recording block;
a modulating part to modulate the generated recording block; and
a recording part to record the modulated recording block on the optical disc.

20. (CANCELED)

21. (CURRENTLY AMENDED) The apparatus as claimed in claim 2019, wherein the partitioning portion divides each of the ECC blocks in the column direction by a predetermined number of bytes and divides each of the ECC blocks in the row direction by the predetermined number of bytes to generate the plurality of partitions.

22. (CURRENTLY AMENDED) The apparatus as claimed in claim 2019, wherein the recording block generating portion sequentially interleaves the extracted data to generate the recording block.

23. (CURRENTLY AMENDED) The apparatus as claimed in claim 2019, wherein the partitioning portion obtains a common divisor d for $N1$ and $N2$, wherein a size of the ECC blocks is $N1 \times N2$ bytes where $N1$ and $N2$ are positive integers, and divides each of the ECC blocks by d bytes in the column direction to generate a plurality of object blocks, and divides each of the object blocks into d portions in the column and row directions to generate $d \times d$ partitions.

24. (CURRENTLY AMENDED) An apparatus to record data on an optical disc, the apparatus comprising:

an error correction code (ECC) encoder to generate two ECC blocks; and
an interleaver to divide each of the two ECC blocks by a first unit in a row direction and by a second unit in a column direction to generate a plurality of partitions, and to alternately extract data from the partitions, and to interleave the extracted data and thereby generate a recording block;

a modulating part to modulate the recording block; and

a recording part to record the modulated recording block on the optical disc.

25. (CANCELED)

26. (CURRENTLY AMENDED) The apparatus as claimed in claim ~~25~~24, wherein the interleaver divides each of the ECC blocks in the column direction by a predetermined number of bytes to generate a plurality of object blocks, and divides each of the object blocks in the column and row directions by the predetermined number of bytes to generate the plurality of partitions.

27. (CURRENTLY AMENDED) The apparatus as claimed in claim 24, wherein the interleaver obtains a common divisor d for $N1$ and $N2$, wherein a size of the ECC blocks is $N1 \times N2$ bytes where $N1$ and $N2$ are positive integers, and divides each of the ECC blocks by d bytes in the column direction to generate a plurality of object blocks, and divides each of the object blocks into d portions in the column and row directions to generate $d \times d$ of the partitions.

28. (ORIGINAL) The apparatus as claimed in claim 27, wherein the interleaver interleaves $2 \times N2$ row-code words ($N1, k1$) into the recording block.

29. (ORIGINAL) The apparatus as claimed in claim 28, wherein:

the ECC encoder generates the ECC blocks having the row-code words ($N1, k1$), and

column-code words (N_2 , k_2); and

the interleaver converts a block including the $2 \times N_2$ row-code words to generate the recording block, which includes a main data region of $2 \times (N_2 - k_2)$ bytes and an outer parity region of $2 \times k_2$ bytes.

30. (CANCELED)

31. (CANCELED)

32. (CURRENTLY AMENDED) A method of recording/reproducing data comprising:
generating a plurality of error correction code (ECC) blocks, the ECC blocks comprising the data;
dividing each of the ECC blocks into a plurality of partitions; and
interleaving the data from the partitions, comprising alternately selecting the partitions of each of the ECC blocks along diagonal paths;
modulating the recording block; and
recording the modulated recording block on a medium.

33. (ORIGINAL) The method as claimed in claim 32, wherein the interleaving of the data further comprises selecting an equal amount of the data from the partitions of each of the ECC blocks.

34. (ORIGINAL) The method as claimed in claim 32, further comprising encoding the data in the ECC blocks.

35. (ORIGINAL) The method as claimed in claim 32, wherein the interleaving of the

data generates a recording block.

36. (ORIGINAL) The method as claimed in claim 32, wherein the dividing of the ECC blocks comprises dividing each of the ECC blocks into object blocks.

37. (ORIGINAL) The method as claimed in claim 36, wherein the dividing of the ECC blocks further comprises dividing the object blocks into the partitions.

38. (CURRENTLY AMENDED) The method as claimed in claim 37, wherein a size of the ECC blocks is $N1 \times N2$ bytes where $N1$ and $N2$ are positive integers, d is a common divisor of $N1$ and $N2$, and the dividing of the ECC blocks into the object blocks comprises dividing the ECC blocks by d ~~bytes~~ bytes in a first direction.

39. (ORIGINAL) The method as claimed in claim 38, wherein the dividing of the object blocks into the partitions comprises dividing the object blocks into d portions in the first and a second direction.

40. (CURRENTLY AMENDED) The method as claimed in claim 35, further comprising:

~~modulating the recording block;~~

~~recording the modulated recording block on a medium;~~

reading the modulated recording block from the medium;

demodulating the modulated recording block; and

deinterleaving the demodulated recording block.

41. (CURRENTLY AMENDED) The method as claimed in claim 1, wherein a burst

error is corrected by the interleaving the data.

42. (ORIGINAL) The method as claimed in claim 17, wherein the second recording block comprises sectors, and the row-code words comprise an identifier ID in each of the sectors.

43. (ORIGINAL) The method as claimed in claim 42, wherein the row-code words are obtained by Reed-Solomon Product coding.

44. (ORIGINAL) The method as claimed in claim 9, wherein the first recording block comprises an outer parity region and a main data region.

45. (ORIGINAL) The method as claimed in claim 18, wherein $2 \times k/32$ rows of the data are extracted from the outer parity region to form a sector of the second recording block.

46. (WITHDRAWN) A method of reproducing data from a medium, the data comprising a recording block, the recording block generated by alternately interleaving the data from a plurality of partitions generated by dividing a plurality of error correction code (ECC) blocks, the method comprising:

reading the recording block from the medium; and

deinterleaving the read recording block.

47. (WITHDRAWN) An apparatus to reproduce data from a medium, the data comprising a recording block, the recording block generated by alternately interleaving the data from a plurality of partitions generated by dividing a plurality of error correction code (ECC)

blocks, the apparatus comprising:

a reader to read the recording block from the medium; and

a deinterleaver to deinterleave the read recording block.